

User's Manual



**Smart Wand
Wedge Interface
25-WEDGE-04
Ver. May 2000**



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NOTICE

Opticon has taken every step to ensure that the information included in this manual is accurate, however we reserve the right to change any specification at any time without prior notice.

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General Information

The Opticon smart wand is an intelligent wand with a built-in, state-of-the-art 16-bit single chip decoder. Housed in a durable ABS plastic case, the Opticon smart wand offers unparalleled performance at an economical price with the following features:

- Built-in internal decoder
- Optional "Good Read" LED indicator light
- "Good Read" audible beeper
- Optional ON/OFF switch (MSH-220)
- User replaceable ruby ball tip and cable
- Autodiscriminates among all major bar code symbologies
- Bar code menu programmable

Wedge Interface

The Opticon smart wand has built-in intelligence to connect directly to a personal computer without the need for a separate decoder box. Scanned bar codes appear to the computer as if the data was typed into the keyboard. Normal operation of the keyboard is unaffected. The wedge interface is compatible with virtually any application program accepting keyboard input.

Advantages

- Low cost – no separate decoder box required
- No special software installation or technical support required
- Same communication signal format as keyboard
- Simple installation
- No external power supply
- Full featured bar code menu offers user flexibility
- Uses existing keyboard type

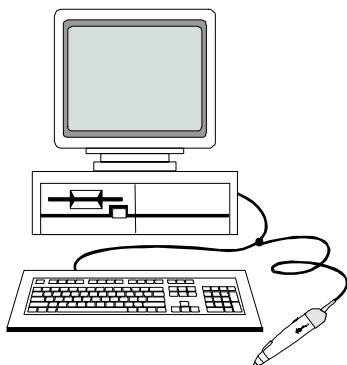
Set Up

Unpacking

Remove the smart wand from its packaging and inspect it for damage. If the smart wand was damaged in transit, call the Opticon Customer Service Dept. at 800-636-0090.

Installation

A "Y" connection cable is provided for installation. The smart wand is installed or "wedged" between the keyboard and the computer's CPU. The "Y" cable connects both the smart wand and the keyboard to the computer.



WARNING!

In order to avoid possibility of damage to the computer, turn OFF the computer prior to installing the smart wand. Install both wand and "Y" cable while power to the system is OFF.

User Maintenance

There is no user maintenance required for the OPTICON smart wand. Replacement wand tips and cables are available from Opticon. To remove wand tip, simply rotate the tip counter-clockwise. To remove cable, simply pry the rubber cover backward and remove the cable from the wand.


Programming the Smart Wand

This User's Guide provides an easy way of changing certain parameters. A parameter is changed by scanning a specific bar code associated to a specific function.

To select menu options:

1. Scan **START**. The smart wand will beep intermittently to indicate that it is ready to be programmed.
2. Make parameter selection from menu. A beep and a read light (MSH-220 only) indicates that the parameter has been scanned.
3. Scan **END**. This completes the operation and the new parameter is saved in memory.

The smart wand is typically programmed as a keyboard wedge for IBM's AT or PS/2 models 50, 60, 70 and 80. If the host computer is not one of these models, please refer to "Computer Type Selection" on page 18 of the bar code scanning menu to make another selection.

NOTE: () A pointing finger indicates scanner default settings.

Scanning

If the wand has a trigger switch, press button near the tip. Red LED illumination will emit from the ruby ball tip of the wand. If the wand does not have a trigger switch, then the red LED will remain illuminated as long as the computer system is on.

1. Place the tip of the wand about $\frac{1}{4}$ to $\frac{1}{2}$ inch to the right or left of the bar code. The wand top must make contact with the bar code label.
2. Move the wand over the bar code label quickly with uniform speed. For maximum performance, slightly tilt the wand while scanning.
3. The wand will beep to indicate an audible good read (if it does not beep, confirm that beeper is enabled (page 38). If the wand has a "Good Read" LED indicator (MSH-220 only), it will illuminate indicating a good read.

NOTE: The wand will read all bar code symbologies listed in the menu section of this Guide.

Troubleshooting

- A. If LED's do not light up when installation instructions are followed:
 - Make sure there is power to the system
 - Recycle computer power
 - Confirm computer fuses are ok.
 - Check for loose cable connection

- B. If the wand tip lights up, "Good Read" beep is audible, but outputs random characters to screen, verify that the wand has been programmed to the correct settings:
 - Confirm selected "Computer Type" matches the type of computer being used.
 - Adjust "Intercharacter Delay" settings. Intercharacter delay settings will vary according to the computer type being used.
 - Is a dedicated file server being used? Non-dedicated file servers may cause problems for a Wedge interface. Opticon recommends using an RS232C CCD smart wand on non-dedicated file servers.

3. If the wand tip lights up, but "Good Read" beep is not heard and no data appears on the computer:
 - Is the bar code label readable? Does it meet bar code specifications?
 - Does the smart wand read other bar code labels? (If yes, the non-reading label may be a label which the smart wand is not programmed to decode.)

NOTE: If after performing these checks, the smart wand is still not functioning, contact your distributor or call Opticon Technical Support at 800-636-0090.

Factory Service

When calling Opticon Technical Support, please have the unit model number and several bar code labels readily at hand.

Technical Specifications

Physical

Case Material	ABS Plastic
Tip	Synthetic Ruby Ball
Cable	Straight
Dimensions	159 x 32 x 19 mm (6.25 x 1.25 x 0.75 in)
Weight	85 g (3 oz.)
Cable Length	5 ft. (approx.)

Optical

Light Source	Red LED; $\lambda = 660 \text{ nm}$
Tilt Angle	35° max.
Resolution	5 mil (min.)
Depth of Field	Contact scanner
Scan Speed	2 to 60 in/sec.
Print Contrast Ratio	0.35 min.

Electrical

Supply Voltage	4.5 to 5.5 VDC
Current	
Operating	Less than 90 mA
Standby	Less than 20 mA

Environmental

Temperature	
Operating	0 to +49° C (+32° to +120° F)
Storage	-9 to +71° C (+15° to +160° F)
Humidity	Up to 90% RH (non-condensing)
Shock	40" drop onto hardwood

Interface

Wedge	Keyboard Emulation
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Accessories Available

<u>Part Number</u>	<u>Description</u>
28-WAND2-01	Desktop Stand
61-MSH02-01	Ruby ball wand tip replacement
41-W0001-01	Y Cable /AT
41-W0002-01	Y Cable /PS2
25-WEDGE-04	Manual/Wedge Interface

FCC Information

This equipment has been tested and is found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate RF energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the users authority to operate this equipment.

Warranty

This smart wand is warranted for a period of five (5) years from date of shipment from Opticon, including all defects in material and workmanship for the first year and electronics only thereafter. Opticon will, at its option, repair or replace products which prove to be defective in material or workmanship under proper use within the warranty period. Opticon will consider any product out-of-warranty if the unit has been subjected to misuse, accident or incorrect installation. No other warranties are expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Opticon is not liable for consequential damages.

If the smart wand must be returned, please contact Opticon to obtain an RMA (Return Merchandise Authorization) number prior to returning the product. The Customer Service Dept. may be reached at 800-636-0090.

NOTE: Returned merchandise will NOT be accepted without a RMA number indicated clearly on the outside of the carton.

Glossary

ASCII - American Standard Code for Information Interchange. A 7 bit plus parity code representing 128 letters, numerals, punctuation marks, and control characters. It is a standard data transmission code in the US.

Autodiscrimination - The ability of bar code reading equipment to recognize and correctly decode more than one symbology.

Bar Code - An automatic identification technology which encodes information into an array of varying width parallel rectangle bars and spaces.

Bar Code Density - The number of data characters which can be represented in a linear unit of measure. Bar code density is often expressed in characters per inch.

CCD (Charged Coupled Device) - A technology in which scanning is accomplished with an array of LED's flooding the bar code with light.

Check Digit - A digit used to verify a correct symbol code. The scanner inserts the decoded data into an arithmetic formula and checks that the resulting number matches the encoded check digit. Check digits are required for UPC but are optional for other symbologies. Using check digits decreases the chance of substitution errors when a symbol is decoded.

Codabar - A discrete self-checking code with a character set consisting of digits 0 to 9 and six additional characters (- \$: / , +).

Code 128 - A high density symbology which allows the controller to encode all ASCII characters without adding extra symbol elements.

Glossary (cont.)

Code 3 of 9 (Code 39) - A versatile and widely used alphanumeric bar code symbology with a set of 43 characters types, including all upper case letters, numerals from 0 to 9 , and 7 special characters (- / . + % \$ and space). The code name is derived from the fact that 3 of 9 elements representing a character are wide, while the remaining 6 are narrow.

Decode - To recognize a bar code symbology and then analyze the content of the specific bar code scanned.

Default - A standard setting assigned to a parameter type unless a different setting is assigned to that parameter.

Depth of field - The distance between the maximum and minimum plane in which bar code reader is capable of reading symbols.

EAN (European Article Number) - This European/International version of the UPC provides its own coding format and symbology standards. Element dimensions are specified metrically. EAN is used primarily in retail.

Encode - To translate data into machine readable form using the format and conventions of a specific bar code symbology.

Host Computer - A computer that serves other terminals in a network, providing such services as computation, database access, supervisory programs, and network control.

Glossary (cont.)

Interleaved 2 of 5 - A binary code symbology representing character pairs in groups of five bars and five interleaved spaces. Interleaving provides for greater information density. The location of wide elements (bars/spaces) within each group determines which characters are encoded. This continuous code type uses no Inter-character spaces. Only numeric (0 to 9) and START/STOP characters may be encoded.

Parameter - A setting that can have a different function assigned to it.

Programming mode - The state in which a scanner is configured for parameter settings.

Quiet Zone - A clear space, containing no machine readable marks, which precedes the start character of a bar code symbol and follows the stop characters.

Read Rate - The ratio of the number of successful reads on the first attempt to scan to the total number of attempts.

Resolution - In a bar code system, the narrowest element dimension which can be distinguished by a particular reading device or printed with a particular device or method.

Scanner - An electronic device used to scan bar code symbols and produce a digitized pattern that corresponds to the bars and spaces of the symbol.

Scanning Mode - The scanner is energized, programmed, and ready to read a bar code.

Start/Stop Character - A pattern of bars and spaces that provides the scanner with start and stop reading instructions and scanning direction. The start and stop characters are normally to the left and right margins of a horizontal code.

Glossary (cont.)

Symbology - The structural rules and conventions for representing data within a particular bar code type.

UPC (Universal Product Code) - A relatively complex numeric symbology. Each character consists of two bar codes and two spaces, each of which can be any of four widths. The standard symbology for retail food packages in the United States.



Wedge - A device that plugs in between a keyboard and a PC. Includes a scanner allowing data to be entered either by a keyboard or scanner.

Part II

Bar Code Menu Functions

Reset All Defaults





The following commands reset all previously programmed options and return the unit to factory default settings.

Z9	Start/End Program Menu	
U1	Reset all defaults	












Computer Type Selection

The Wedge interface program is designed to operate on IBM personal computers and compatibles. **NOTE:** If the scanner has not been set to the correct host computer, the scanner will display random characters on the screen after reading a bar code label.

Z9	Start/End Program Menu	
K0	IBM PC/XT	
K1	IBM AT & compatibles (PS-2/50, 60. 70. 80)	
K2	IBM PS-2/ 25, 30	

Symbology Selection









The scanner autodiscriminates many bar code symbologies. However, if only one symbology is required, programming the scanner to read only that symbology will speed operation and eliminate read errors.

Z9	Start/End Program Menu	
A0	Read all codes	
A1	UPC & all variants only	
A2	Code 39 only	
A3	Codabar only	
A4	2 of 5 only	
A5	Code 93 only	
A6	Code 128 only	
A7	MSI/Plessey only	



Symbology Additions

Use this menu to add a second, third, fourth, etc. symbology to be read if scanner is not programmed to read all symbologies. To speed operation and eliminate read errors, add only the symbologies that are required.

Z9	Start/End Program Menu	
B1	Enable UPC & all variants	
B2	Enable Code 39	
B3	Enable Codabar	
B4	Enable 2 of 5	
B5	Enable Code 93	
B6	Enable Code 128	
B7	Enable MSI/Plessey	











UPC Settings

Options for UPC. *NOTE:* Abbreviations: Xmit = transmit; NSC = Number System Character; CD = Check digit

Z9	Start/End Program Menu		
C8	EAN-13 as UPC-A off		
C9	EAN-13 as UPC-A on		
CA	EAN-13 CD Xmit on		
CB	EAN-13 CD Xmit off		
L0	Enable add-on code		
L1	Disable add-on code		
M0	UPC-E CD Xmit off		
M1	UPC -E CD Xmit on		

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UPC Settings

Z9	Start/End Program Menu	
M2	UPC-A CD Xmit off	
M3	UPC-A CD Xmit on	
M4	UPC-E; NSC = 1 off	
M5	UPC-E; NSC = 1 on	
M6	Xmit ISBN as EAN-13	
M7	Xmit ISBN as UPC-A	
M8	Xmit ISBN w/out CD	
M9	Xmit ISBN with CD	
N0	Xmit UPC-A w/out NSC	













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UPC Settings








Z9	Start/End Program Menu		
N1	Xmit UPC-A with NSC		
N2	Xmit UPC-E w/out leading "0"		
N3	Xmit UPC-E with leading "0"		
N4	UPC-E expansion off		
N5	UPC-E expansion on		
N6	Xmit UPC-A as EAN-13 off		
N7	Xmit UPC-A as EAN-13 on		
N8	Xmit EAN-13 as ISBN off		
N9	Xmit EAN-13 as ISBN on		

Code 39 Settings

Z9	Start/End Program Menu	
C0	Code 39 CD computation off	 
C1	Code 39 CD computation on	
C2	Code 39 CD Xmit off	 
C3	Code 39 CD Xmit on	
C4	Code 39 full ASCII off	 
C5	Code 39 full ASCII on	










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Code 39 Settings

Z9	Start/End Program Menu		
D0	Code 39 Xmit start/stop off		
D1	Code 39 Xmit start/stop on		
D2	Code 39 single digit on		
D3	Code 39 single digit off		









Codabar Settings

Options for Codabar (also known as NW-7).

Z9	Start/End Program Menu	
E0	Codabar CD computation off	 
E1	Codabar CD computation on	
E2	Codabar CD Xmit off	
E3	Codabar CD Xmit on	
E4	Codabar start/stop match off	
E5	Codabar start/stop match on	 

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Codabar Settings

Z9	Start/End Program Menu	
F0	Codabar start/stop xmit off	
F1	Codabar start/stop as ABCD/TN*E	
F2	Codabar start/stop as abcd/tn*e	
F3	Codabar start/stop as ABCD/ABCD	
F4	Codabar start/stop as abcd/abcd	
F5	Codabar single digit off	
F6	Codabar single digit on	







2 of 5 Settings

Options for I 2 of 5 (Interleaved 2 of 5) and D 2 of 5 (Industrial 2 of 5).

Z9	Start/End Program Menu	
G0	I 2 of 5 CD computation off	 
G1	I 2 of 5 CD computation on	
G2	I 2 of 5 CD Xmit off	
G3	I 2 of 5 CD Xmit on	 
G4	I 2 of 5 leading "0" Xmit off	
G5	I 2 of 5 leading "0" Xmit on	 
G6	D 2 of 5 CD computation off	 

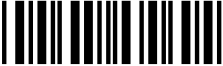











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2 of 5 Settings

Z9	Start/End Program Menu	
G7	D 2 of 5 CD computation on	
G8	D 2 of 5 CD Xmit off	
G9	D 2 of 5 CD Xmit on	










Code 128 & MSI/Plessey Settings

Z9	Start/End Program Menu		
C6	Code 128 CD computation off		
C7	Code 128 CD computation on		
J0	MSI/Plessey CD Xmit on		
J1	MSI/Plessey 1 CD Xmit off		
J2	MSI/Plessey both CD Xmit off		
J3	MSI/Plessey with 1 CD		
J4	MSI/Plessey with mod 10/mod 10		
J5	MSI/Plessey with mod 11/mod 11		

Bar Code Length Options








One or two lengths may be selected for free format bar codes. Only free format bar codes of the selected length(s) will be accepted.

Z9	Start/End Program Menu	
H0	Fixed length mode	
H1	Free 2 of 5 length	
H2	Free Codabar length	
H3	Free MSI/Plessey length	
H4	Free Code 39 length	
H5	Free all lengths	



Scan Code Delay







The timing of the keyboard house-keeping codes are set by these commands.

Z9	Start/End Program Menu	
L2	2 ms delay	
L3	4 ms delay	
L4	6 ms delay	
L5	8 ms delay	
L6	10 ms delay	
L7	12 ms delay	



Intercharacter Delay





For some application programs and IBM compatibles, the scanner may send data faster than the computer or application program can accept. This is called "keyboard buffer overrun". If data appears to be missing, random read errors occur or the scanner locks up and will not scan, experiment with the various keyboard timing options listed in the menu to follow.

Z9	Start/End Program Menu	
I0	No delay	
I1	10 ms delay	
I2	20 ms delay	
I3	30 ms delay	
I4	40 ms delay	



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Intercharacter Delay

Z9	Start/End Program Menu	
I5	50 ms delay	
I6	60 ms delay	
I7	70 ms delay	




Beeper Settings

Z9	Start/End Program Menu	
W0	Disable beeper	
W1	Enable beeper	
W2	Disable good read light	
W3	Enable good read light	
W4	Good Read with beep	
W5	Good Read after beep	



Trigger Options (MSH-220 Only)








Select the appropriate bar code to enable or disable the trigger. By disabling the trigger, the scanner LED's remain on as long as the computer power is on.

Z9	Start/End Program Menu	
Y0	Enable trigger	
Y1	Disable trigger	



Suffix Options








The suffix menu enables the user to transmit a carriage return ("CR"), line feed ("LF"), tabs, etc. after transmission of the bar code data. NOTE: Only one suffix selection can be programmed at a given time.

Z9	Start/End Program Menu	
00	No suffix	
01	Carriage return	
02	Line feed	
03	Carriage return & line feed	
04	Tab (right)	
05	Shift tab (left)	



Keyboard Emulation Options










Keyboard emulation options allow the user to emulate the function, arrow and other keys on the computer keyboard. Also, the user has the option of transmitting all upper case or all lower case characters. To begin Keyboard emulation mode, first scan "**Start**", then "**Keyboard Emulation On**", then "**End**". To emulate one of the function or arrow keys, do not scan "**Start**" before scanning the keyboard emulation bar code. **NOTE:** Function key emulation cannot be performed while "Full ASCII Code 39" is enabled.

Z9	Start/End Program Menu	
D6	Keyboard emulation mode off	
D7	Keyboard emulation mode on	
O6	Xmit normal	
O7	Xmit all upper case	
O8	Xmit all lower case	
O9	Reverse upper & lower case	












Keystroke Emulation Options

List of all keystroke emulated bar code that are only functional when Keyboard Emulation is on. Scanning "Start" is not required to read these codes.

/-1	F1	
/-2	F2	
/-3	F3	
/-4	F4	
/-5	F5	
/-6	F6	
/-7	F7	
/-8	F8	
/-9	F9	




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Keystroke Emulation Options

/-A	F10	
/-B	F11	
/-C	F12	
/-D	Page up	
/-E	Page down	
/-F	Home	
/-G	End	
/-H	Arrow up	
/-I	Arrow down	







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Keystroke Emulation Options

/-J	Arrow left	
/-K	Arrow right	
/-L	Enter	







Transmit Current Settings

These codes transmit the current settings (check digit transmission, for example) for the symbolologies listed.

Z9	Start/End Program Menu	
Q0	Send software switches	
Q1	Send Code 39 info	
Q2	Send Codabar info	
Q3	Send I 2 of 5 Info	
Q4	Send D 2 of 5 info	

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Transmit Current Settings

Z9	Start/End Program Menu	
Q5	Send Code 128 & 93 info	
Q6	Send MSI/Plessey info	
Q7	Send UPC-A info	
Q8	Send UPC-E info	
Q9	Send EAN-13 & EAN-8 info	
QB	Send system info	